

Amendments to the Claims:

Please cancel objected to claims 17 - 21 without prejudice or disclaimer of the subject matter thereof and incorporate the features thereof in the respective independent claims 1, 5, 6, 13 and 14 as follows.

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An autonomous self-propelled cleaning device comprising:

a moving means for moving the cleaning device;

a driving means for driving said cleaning device;

a control means for controlling the moving means;

an orientation angle detection means for detecting an orientation angle of the cleaning device;

a wall surface detection means which is capable of detecting a wall surface in a position at one side of the cleaning device;

wherein the control means determines rectangular spiral travel paths based on an orientation angle detected by the orientation angle detection means and causes the cleaning device to travel along the rectangular spiral travel paths for cleaning a room including travel alongside the wall surface which partitions the room to be cleaned and which is detected by the wall surface detection means, and

the driving means drives the cleaning device such that it moves along the travel path;

wherein the rectangular spiral travel paths are in a form of continuous loops

which at least partially overlap with each other.

2. (original) A self-propelled cleaning device described in Claim 1, comprising an obstacle detection means for detecting an obstacle at a position in front of the cleaning device, and if the obstacle detection means detects an obstacle on the travel path, the control means controls the moving means such that the obstacle is avoided.

3. (original) A self-propelled cleaning device described in Claim 2, wherein the control means controls the moving means such that if the obstacle detection means detects an obstacle in the advance direction of the cleaning device, the cleaning device moves alongside the right-side or left-side of the obstacle such that the obstacle is avoided.

4. (original) A self-propelled cleaning device described in Claim 1, comprising a map recording means capable of storing information on the region for cleaning, in which the control means determines a rectangular travel path based on the information recorded in the map recording means.

5. (currently amended) A method for operating a self-propelled cleaning device capable of autonomous movement, comprising the steps of:

causing the cleaning device to travel along a plurality of looped travel paths including travel routes along a pair of opposing wall surfaces;

detecting a reference direction for the self-propelled cleaning device on at least one of the travel routes along the wall surface; and

determining a travel path other than the travel routes along the wall surface based on the reference direction;

wherein the plurality of looped travel paths are continuous loops which at least partially overlap with each other.

6. (currently amended) A method of operation for a self-propelled cleaning device comprising a moving means for moving on the floor surface; a control means for controlling the moving means; and a cleaning means for cleaning the floor surface, wherein said method of operation comprises the steps of:

finding the wall surface prior to the start cleaning using one of right-side tracking and left-side tracking alongside the wall surface; and

cleaning, when the wall surface is found, based on information detected by an orientation angle detection means for detecting the orientation angle of the cleaning device, and a wall surface detection means for detecting the position of the wall surface, and which takes a plurality of spiral travel paths which partially overlap with each other;

wherein the plurality of spiral travel paths are in the form of continuous loops which at least partially overlap with each other.

7. (original) A method for operating a self-propelled cleaning device described in Claim 6, wherein the spiral travel path comprises: a first horizontal movement path alongside a first wall surface segment of the wall surface; a first vertical movement path that is continuous with the first horizontal path; a second horizontal movement path that is continuous with first vertical movement path alongside the second wall surface segment opposing the first wall surface segment and; a second vertical

movement path that is continuous with the second horizontal movement path.

8. (original) A method for operating a self-propelled cleaning device described in Claim 6, wherein when the cleaning device travels on at least the first or second horizontal movement path, the orientation angle detection means detects the orientation angle, and sets the direction of the first and second vertical movement path based on the detected orientation angle.

9. (original) A method for operating a self-propelled cleaning device described in Claim 8, wherein the orientation angle is continually corrected using the orientation angle detected by the orientation angle detection means when the cleaning device is caused to travel on the first horizontal movement path and the orientation angle of the first wall surface segment stored in the map recording means that stores wall surface information.

10. (original) A method for operating a self-propelled cleaning device described in Claim 9, wherein the cleaning device tracks around the wall surface before cleaning begins, and wall surface information is stored in the map recording means based on the wall surface information detected at the time of tracking.

11. (original) A method for operating a self-propelled cleaning device described in Claim 5, wherein the looped travel path comprises a first vertical movement path that is substantially orthogonal with respect to the travel route along the wall surface, and a second vertical movement path, and the interval between these two movement paths is an odd-number multiple of half of the interval between the two adjacent

looped travel paths.

12. (original) A method for operating a self-propelled cleaning device described in Claim 5, wherein the interval between the two adjacent looped travel paths is between 1 and 2 times the width cleanable by the cleaning means.

13. (currently amended) A method for operating a self-propelled cleaning device which uses an orientation angle detection means and a wall surface detection means which detects wall surface to clean regions enclosed by a plurality of wall surface segments, said method comprising:

a first step of moving the cleaning device until it approaches the obstacle or the wall surface segment;

a second step of moving the cleaning device such that one of the right-side and left-side of the cleaning device approaches the object, and then tracking the cleaning device around the object; [[and]]

a third step of comparing the direction of the accumulative variation of the orientation direction detected by the orientation direction detection means with the direction of the side of cleaning device approaching the object in the second step, selecting the result of comparison to be equality when the first direction is clockwise and the second direction is a right-side, or the first direction is counterclockwise and the second direction is a left-side[[.]]; and

a fourth step of rotating the cleaning device by a prescribed angle and repeating the process from the first step when the result of comparison in the third step is equality;

wherein the cleaning device is moved along rectangular spiral travel paths in

a form of continuous loops which at least partially overlap each other.

14. (currently amended) An autonomous self-propelled cleaning device having a main body, a movement means for moving the main body on a floor surface, a control means for operating the movement means and for controlling the movement of the main body, a cleaning means provided on the main body and for cleaning the floor surface, an orientation angle detection means for detecting an orientation angle of the main body, and a wall surface detection means for detecting a relative position of the wall surface to the main body, and a region enclosed by a plurality of wall surface segments is cleaned; ~~the autonomous self-propelled cleaning device,~~

_____ wherein[[,]] the control means comprises wall surface search means which has a first step of moving the main body until it approaches an obstacle, a second step of moving the main body such that the main body approaches to the obstacle in a prescribed side direction to an advance direction of the main body and tracking the main body around the obstacle, a third step of comparing the direction of accumulative variation of the main body detected by the orientation angle detection means in the tracking-around movement with the prescribed direction, and a fourth step of rotating the main body by a prescribed angle and repeating the process from the first step when the result of comparison in the third step is equality, and

_____ wherein the cleaning device is moved along rectangular spiral travel paths in a form of continuous loops which at least partially overlap each other.

15. (previously presented) A self-propelled cleaning device described in Claim 1, wherein the rectangular spiral travel path comprises:

a first horizontal movement path for moving to a predetermined position alongside to the wall surface;

a first vertical movement path being arranged orthogonally with the first horizontal movement path and for moving to an opposite wall surface to the wall surface of the first horizontal movement path;

a second horizontal movement path being arranged in a reverse direction to the first horizontal movement path alongside to the wall surface which is opposite to the wall surface of the first horizontal movement path and for moving a distance shorter than the first horizontal movement path; and

a second vertical movement path being arranged orthogonally with the second horizontal movement path and for moving to the wall surface of the first horizontal movement path.

16. (previously presented) A self-propelled cleaning device described in Claim 15, wherein the cleaning device makes spiral loops comprising the first horizontal movement path, the first vertical movement path, the second horizontal movement path, and the second vertical movement path until the cleaning device returns to a start position.

17. (canceled)

18. (canceled)

19. (canceled)

20. (canceled)

21. (canceled)